

THE HOME AND WORKSHOP OF EDISON.

By Warren Taylor.



THE inventor is an individual who has arisen, in these later days of the world's history, to share the glory and renown formerly monopolized by successful warriors, despotic rulers, and other less worthy personages. The world is according a tardy recognition to the fact that he who gives to it a means of adding to the comfort of human life is more deserving of gratitude than he who succeeds in slaying ten or even twenty thousand of his fellow men upon the field of battle.

Throughout the long centuries of ancient and medieval history, science was regarded with contempt, as a subject unworthy of serious attention, or with suspicion, as a study allied too closely to the black arts of unlawful magic. Ignorance begets ignorance, and misrepresentation perpetuates itself. The dawn of knowledge was late, and its early growth slow. It was the great Lord Bacon who first swept away the misconceptions that had hindered human advancement, and pointed out the truth that the end and aim of science is to improve man's condition by increasing his grasp upon the secrets and the powers of nature. From that beginning dates modern progress, whose march, tardy at first, has gained speed with every decade. It was in 1769 that James Watt obtained the original patent on his steam engine—an event that har-

nessed to the triumphal car of science the first of those marvelous natural forces that are now its slaves. In 1807 Robert Fulton's boat, the *Clermont*, demonstrated the application of steam to navigation. In 1825 George Stephenson sent the first locomotive engine thundering along the first railroad. In 1844 Morse flashed the first telegraphic message from Baltimore to Washington. The march of invention has grown more and more rapid, and each extension of knowledge brings into view a fresh vista of possibilities. The present generation has seen a greater addition made, by the agency of new inventions, to the activities and the material well being of mankind, than whole centuries contributed in former eras. Of these fresh discoveries the most remarkable and significant have been those gained by the study of that mysterious electrical force, still imperfectly understood, which seems capable of almost unlimited application to human needs, and whose increasing use in a wide range of forms seems to promise the ultimate supersession of other sources of power.

The name of Edison is almost synonymous with the subjugation of electricity to the service of man. It has become famous as that of a typical American genius who, though still a young man, has already turned out a long list of inventions of the first importance. The civilized world regards Edison as the master wizard of the day, and its eyes are constantly fixed upon him in expectation of seeing some marvelous new product of his ingenuity. Of his realized achievements, the phonograph is probably the most salient. The carbon telephone, the tasimeter, and numerous other distinct mechanisms are also

his. More valuable yet, probably, are some of the many improvements that he has effected in electrical apparatus and methods—notably the duplex and quadruplex systems of telegraphy.

As Mr. Edison is a man in the prime of physical and intellectual power, endowed with an unabated enthusiasm for discovery, and an apparently unlimited capacity for work, it is reasonable to suppose that his greatest triumphs are still to come. Such is his own confident hope. It is no secret that he expects to announce, before very long, the completion of the task upon which he is now engaged—the application of electricity to railroading, with results that will utterly eclipse the best efforts of steam, and revolutionize existing systems of transportation.

The story of Mr. Edison's life is a piece of biography that would be condemned as utterly improbable were it the creation of a fiction writer. He was born in 1847, the son of a Canadian immigrant settled at Milan, an Ohio village near the shores of Lake Erie. It was at Port Huron, Michigan, whither his parents removed in 1854, that his self education began—for he never attended a school for more than two months. Boys ambitious of emulating his career would better not imitate him in this particular unless they also follow his example of assiduous study and omnivorous reading at home. He eagerly devoured every book he could lay hands on, and is said to have accomplished the extraordinary task of reading through an encyclopædia without skipping a word.

At thirteen he began his working life as a train boy upon the Grand Trunk railroad between Port Huron and Detroit. Much of his time was now spent in the latter city, where he found increased opportunities for reading at a public library. It is recorded that the young newsman was successful in his calling; but he was not content to remain a mere dealer in periodicals, and decided to become a publisher. His office was an old

freight car, where he got together three hundred pounds of type, and started the issue of the *Grand Trunk Herald*. It was only a small amateur weekly, printed on one side, and without a press, the impression being made from the type with the hand. Still, the venture is an interesting evidence of the originality of the boy's ideas. Chemical research was his next undertaking, and a laboratory was added to his movable publishing house. One day some phosphorus, with which he was experimenting, ignited and set fire to the car, and an irate conductor threw the young seeker after truth, chemicals and all, from the train. His office and laboratory were now transferred to the cellar of his father's house, but his enthusiasm for science remained unquenched. He was intensely interested in the mechanism of railroad engines and more especially in the workings of the electric telegraph. As he grew to manhood he decided to become an operator. The necessary instruction was not so easily obtained then as now. Edison's opportunity was won by a brave action—the rescue of an infant from under the wheels of a train—which was rewarded by an offer from the child's father, himself an operator, to give the lad lessons in telegraphy.

Five months later Edison was competent to fill a position in the railroad office at Port Huron. Hence he peregrinated to Stratford, Ontario, and thence successively to Adrian, Fort Wayne, Indianapolis, Cincinnati, Memphis, Louisville, and Boston, gradually becoming a first rate operator, and gaining experience that aided him to evolve many ingenious ideas for the improvement of telegraph appliances. At Memphis he constructed an automatic repeater, which enabled Louisville and New Orleans to communicate direct, saving both time and labor. For this he received compliments from his employers, but nothing more. In 1870 he came to New York, in search of an opening more suitable to his capabilities and



THOMAS ALVA EDISON.

ambitions. For some time he met with no encouragement. None of the telegraph companies needed his services, and his fortunes were at a very low ebb when at length he found an opportunity to show what he could do. He happened to be in the office of the *Laws Gold Reporting Company* when one of the instru-

ments got out of order, and even the inventor of the system could not make it work. Edison requested to be allowed to attempt the task, and in a few minutes he had overcome the difficulty and secured an advantageous engagement.

From this point dates the beginning of his celebrity. For several

years he had a contract with the Western Union and the Gold and Stock Companies, whereby he received a large salary, besides a special price for all the telegraphic improvements he could suggest. Now, as head of the Edison Electric Company, with its numerous subordinate organizations and connections all over the civilized world, he

the magnificently equipped laboratory at Llewellyn, close to the foot of the picturesque Orange mountain. Here are the home and headquarters of Mr. Edison, who is still sometimes called the Wizard of Menlo Park, though he left Menlo ten years ago. In the grounds at Llewellyn an experimental track has been laid down, which is about four hundred yards

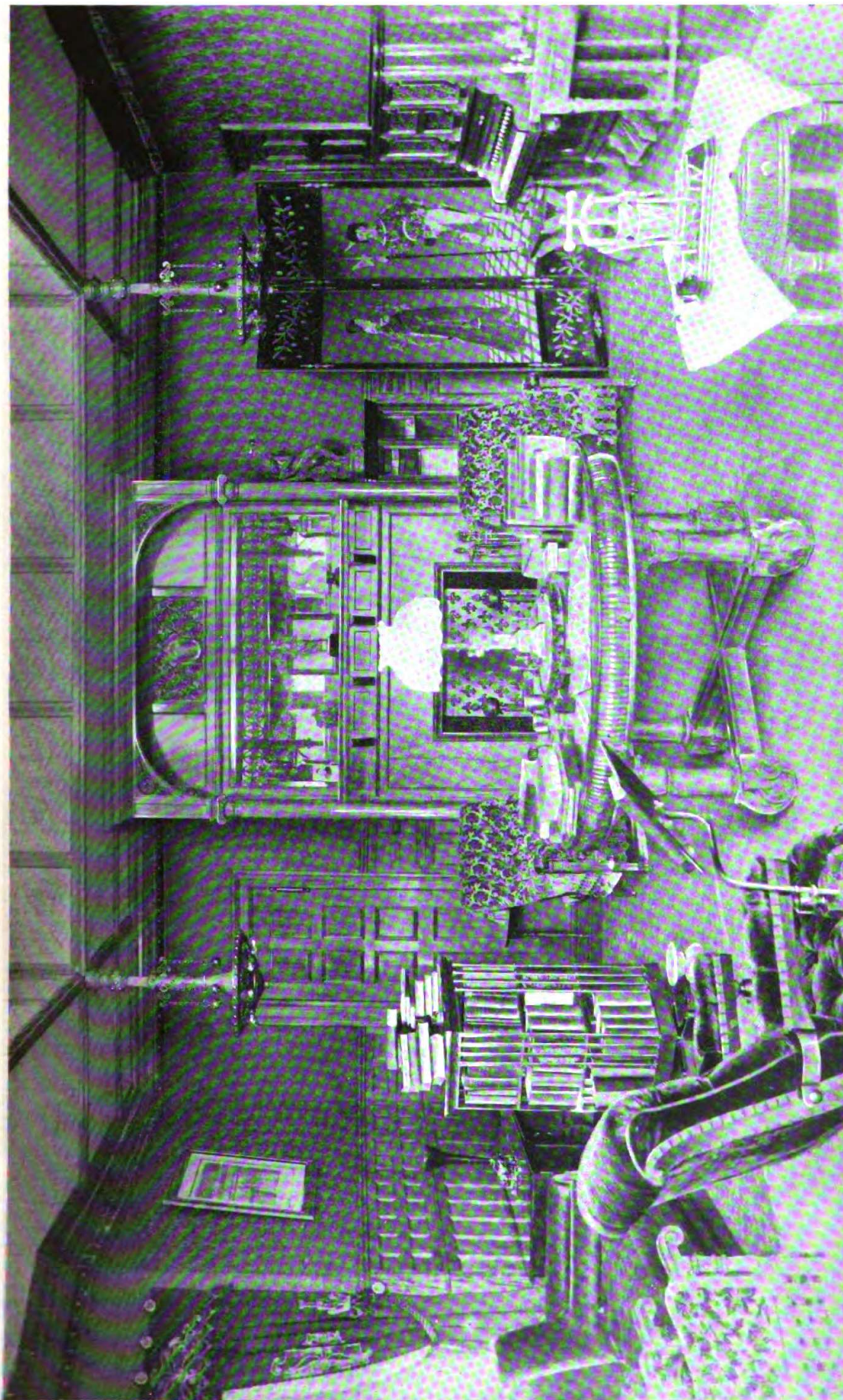


THE EDISON LABORATORY AT LLEWELLYN.

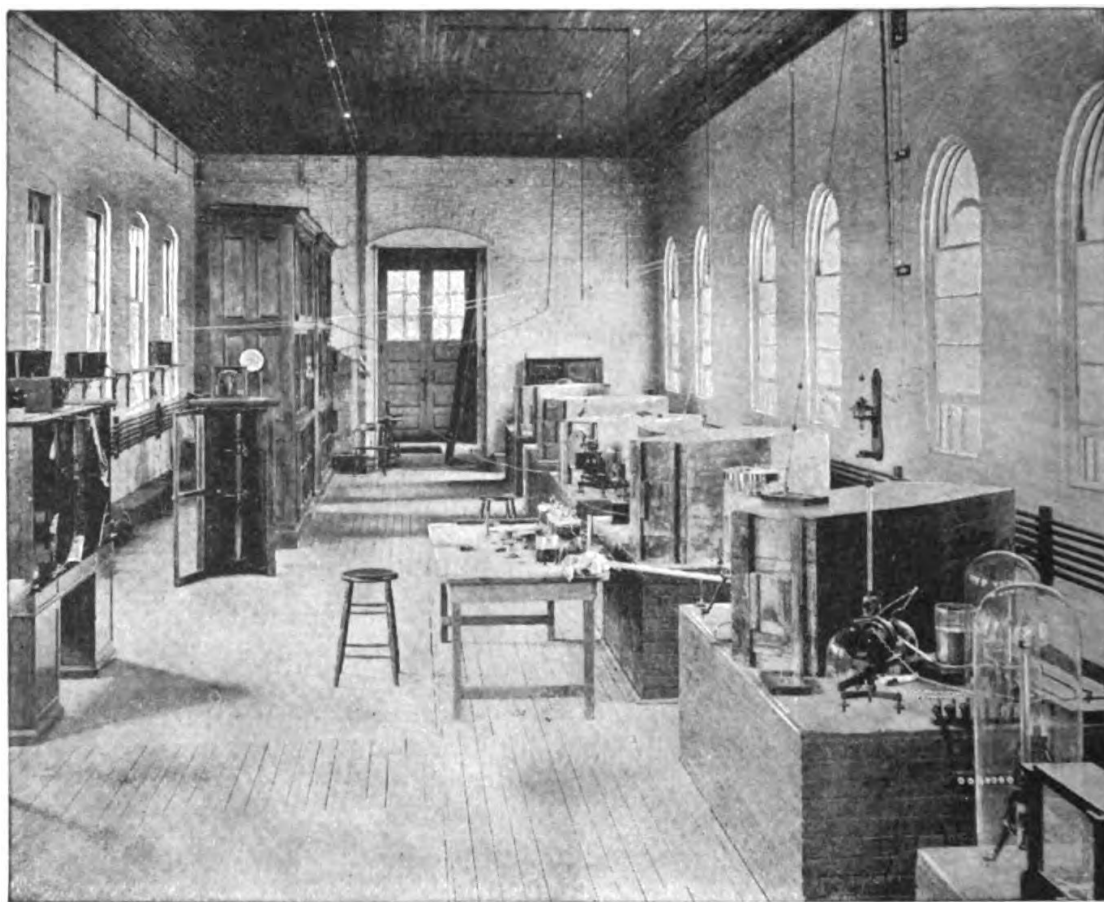
is probably several times a millionaire. Successful inventions are more profitable than most gold mines, and surely no fortune is more honorably won than that of the man who puts dollars into his own pocket by adding hundreds or thousands of them to the wealth of the world. The inventor's financial possibilities are certainly dazzling. For instance, should Mr. Edison's electric railway be proved by actual operation to be what his experiments foreshadow, it would undoubtedly make him rich beyond the oft quoted dreams of avarice. A system almost as much superior to the steam locomotive as that locomotive was to the stage coach would speedily be forced into general adoption on all the railroads of the world, a share of whose earnings—amounting to an annual total of hundreds of millions—would fairly be due to the originator of the motive power employed.

The perfection of this invention is the chief work now in progress at

in length, and contains grades, curves, and all the practical difficulties of a railroad in miniature. The track now has three rails, but Mr. Edison says that the extra rail in the center will not be used in the perfected system. With this discarded—which of course will greatly simplify and cheapen the invention—the general system employed will be the passing of a current down one line of rails, to be “picked up” by the car, passed through the motor, and returned to the central power station by the other line of rails. Mr. Edison is naturally unwilling at present to disclose the details of the system or to explain the manner in which he has overcome the almost insuperable difficulties that have impeded its realization. Among the countless comments of the incredulous the first would probably refer to the apparent impossibility of sending a current through a long stretch of uninsulated rail. Things impossible to others are possible to Mr. Edison,



MR. EDISON'S STUDY IN HIS HOME AT LLEWELLYN PARK.



THE EDISON LABORATORY—GALVANOMETER ROOM.

however. His solution of the problem depends largely upon the phenomenally low voltage of the current he employs, and the fact that leakage diminishes with diminished pressure.

The Edison laboratory is about a quarter of a mile distant from the suburban railroad station of West Orange, and consists of a three story brick building two hundred and fifty feet in length and sixty in width, and four much smaller separate structures. These latter are the galvanometer room, the chemical room, the chemical store room, and another occupied by a magnetic ore separator. In the galvanometer room are all manner of intricate and costly scientific mechanisms—not only galvanometers, but also photometers, electrometers, magnetometers, spectrometers, cathetometers, and chronographs. Here, too, are a microscope that magnifies a million diameters and an electric clock directly connected with

the Smithsonian Institute at Washington. As shown in the illustration on this page, the instruments are set on stone slabs resting upon independent piers of brick, whose foundations are sunk twenty five feet into the ground in order to minimize vibration; while to prevent magnetic interference, all the furnishings and fixtures of the room are of brass and other non-magnetic metals.

The second of the small buildings is the chemical room, whose shelves and tables, laden with all sorts of experimental appliances and materials, are shown on page 191. Chemical investigation is still Mr. Edison's favorite amusement, as it was in his train boy days; but he can now spare to it but little time from his absorbing electrical work.

In the main building is Mr. Edison's scientific library, in the center of which stands the statue that does service as the initial of this article. It is a symbolical group re-



THE EDISON LABORATORY—CHEMICAL ROOM.

presenting the triumph of the electric light over gas, modeled by the Italian sculptor Bordiga, and exhibited at the Paris exposition of 1889, where Edison bought it. On the mantel stands a model engine—the inventor's first essay, made years ago, at the construction of an electric locomotive. Next to the library is a store room stocked with all sorts of materials, commonplace and recondite, that may possibly be of service in the wide range of the Wizard's experiments. Leather, rubber, feathers, ropes, dried grasses, human hair, fish bones, grain, Icelandic and Irish mosses, all sorts of metals, drugs, and glass—these are a few items of the store room's contents, and the list might be almost indefinitely prolonged. Another apartment is a well equipped machine shop, with great presses, lathes, and drills, for the making of dynamo models, ore crushers, or electric motor machinery.

On the second floor of the main

building, reached by an elevator, are the precision room, where more delicate products are turned out by lighter and finer machinery; a glass blowing room, for making experimental lamps; a mercury pump room, where electric light globes are exhausted of air; and apartments occupied by draughtsmen and scientific assistants. Some of the juniors of Mr. Edison's staff are here at work "bug hunting," or searching out flaws in inventions. On the top floor are a lamp test room; an ore milling room, with crushers and mortars; a dynamo room, and a lecture room.

To sum up the facilities of the laboratory, it may be said that in it are concentrated, as hardly anywhere else, all manner of chemical and mechanical powers ready to render immediate service to their director's desires. As an instance of the variety of equipments gathered here, it may be mentioned that the photographs reproduced on



MR. EDISON'S RESIDENCE AT LLEWELLYN PARK.

these pages were made at short notice, with appliances in the laboratory, by one of Mr. Edison's assistants—Mr. W. K. L. Dickson, a talented young Franco-American who has charge of the ore milling machinery and of the final experiments with the kinetograph. This last invention, by the way, is to be exhibited at the Chicago World's Fair, and Mr. Edison predicts that it will before long develop from a scientific marvel into an instrument of practical and widespread usefulness.

Glenmont, Mr. Edison's home, is one of the finest residences in the suburbs of New York. It is a many gabled house, the first floor of brick, the upper portion of wood. It is

approached by a graveled driveway that winds through trees and shrubbery. The interior is elaborately luxurious, with its ample rooms, broad stairways, and floors of polished oak covered with Persian rugs. At noon, and again in the evening, Mrs. Edison drives to the laboratory for her husband, but there are times when she cannot persuade him to leave some unusually interesting and important experiment. He has a bed in Room 2, but sometimes he sets nature at defiance by taking no sleep for days. There is a careworn look upon the great inventor's face, and he is not as rosy as he once was. But in spite of the vast amount of work he has done and is doing, he is still a young man for his years.